

EXHIBIT 3

In The Matter Of:

*THE CITY OF NEW YORK, v.
EXXON MOBIL CORPORATION*

August 17, 2009

*TRIAL
SOUTHERN DISTRICT REPORTERS
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[1] silt and clay. How do these different materials affect the
[2] movement of plumes of MTBE in groundwater?
[3] **A.** Well, aquifer systems like this one -- and we have studied
[4] many like this one. You know, it's kind of like doing
[5] comparative anatomy. We study other humans to learn about the
[6] medical science of individuals, and we apply that in medical
[7] science. But in all systems like this one you tend to have
[8] gravel, sand, silt and clay. Sometimes it's mixed up, and
[9] usually it also occurs in separate pockets. The effects of
[10] that are to make the rate at which groundwater moves, or the
[11] speed of groundwater in the system, to vary quite a bit
[12] locally.

[13] I mentioned last Friday that you could have
[14] groundwater moving at a speed of inches per year in one part of
[15] the system and just a few feet away or inches away have
[16] groundwater moving at a rate of thousands of feet per year, so
[17] that's because of these different materials.

[18] **Q.** And what effect do these different speeds of groundwater
[19] have on the spreading of a contaminant like MTBE in an aquifer?

[20] **A.** The effect is that the contaminant spreads out more because
[21] you have parts of a contaminant moving slowly and parts moving
[22] much more rapidly. It also results in the contaminant being
[23] difficult to clean up. So, there is the basic kind of a mantra
[24] of life that like a lot of things in life it's easier to get in
[25] than it is to get out. Well, that's true of groundwater

[1] contamination everywhere. We know that in every case where
[2] groundwater contamination occurs it's a lot harder to get the
[3] contaminant out than it is for the contaminant to get into the
[4] system.

[5] **Q.** And what effect do these different groundwater speeds have
[6] on how long a contamination problem with MTBE will persist?

[7] **A.** Well, that, together with the size of groundwater
[8] systems -- because they are big. You know, bear in mind that
[9] Long Island is bigger than most lakes, but putting that aside,
[10] these different materials make it such that the contaminants
[11] persist for longer and decades to centuries longer in the
[12] system because you have significant amounts of slow-moving
[13] groundwater, even in areas where you have fast-moving
[14] groundwater that would be considered aquifers.

[15] **Q.** And how does this affect the concentrations of MTBE over
[16] time at a high volume well like a public supply well?

[17] **A.** Basically what we observe is that when a contaminant comes
[18] through at a well, or arrives at a well, typically what happens
[19] is the concentration goes up pretty quickly to maximum levels,
[20] and by quickly I mean over a period of years to decades.
[21] Sometimes it's days. It depends on the scale of the system and
[22] what's happening. So, usually you get a rapid rise or a rapid
[23] peak. Kind of like when a river goes into flood, the river
[24] stage peaks relatively quickly, and then over time it takes a
[25] much longer time for the stage of the river to go down. After

[1] the rain event all the water has to drain out of the watershed
[2] through the various parts of the river or the stream network.

[3] In groundwater, it's like that, but on a completely
[4] different time scale. So the contaminant rises up, peaks
[5] relatively quickly, a time period of days, weeks, decades, and
[6] then the concentration declines over a much longer time period
[7] of say years, decades, centuries, depending on the context of
[8] the system.

[9] **Q.** And do you have a short three-minute video which shows this
[10] effect in a model?

[11] **A.** Yes.

[12] **Q.** Before we view this video, where did it come from?

[13] **A.** This is an instructional video that I use every year in my
[14] classes at UC Davis, and it was produced by Batelle Pacific
[15] Northwest lab, which is a scientific think tank in Washington
[16] State.

[17] **Q.** How does the aquifer modeled in this video compare to
[18] Brooklyn/Queens aquifer?

[19] **A.** The very same kinds of things that you see in this movie
[20] occur in the Brooklyn/Queens aquifer and virtually every other
[21] sandy gravelly type of aquifer system like this one.

[22] **Q.** And so does this video fairly depict the effect of
[23] different groundwater speeds in the Brooklyn/Queens aquifer?

[24] **A.** Well, it's much faster. What you are going to see -- for
[25] us to witness what we would see in the video we would have to

[1] sit here for decades. So, it's obviously greatly sped up. But
[2] the differences in the rates of movement of the groundwater
[3] that are illustrated in the video are typical of what you would
[4] see in a system, but the video is even much simpler than what
[5] occurs in nature. So, it's an instructional video, but it's
[6] very fast, and it's not quite as variable as reality.

[7] **Q.** But it will help us understand how this works?

[8] **A.** Yes.

[9] **MR. STEIN:** If we could play the video.

[10] **MR. STACK:** Your Honor, I might be confused -- maybe
[11] the jury understands -- but are we looking at the movement of
[12] water or contamination? And if it's contamination, what
[13] contaminant?

[14] **THE COURT:** Do you understand his question?

[15] **THE WITNESS:** Yes.

[16] **THE COURT:** You may answer.

[17] **THE WITNESS:** The video shows the movement of a
[18] contaminant that is moving with the water, so it applies to
[19] MTBE in the absence of biodegradation or sticking to the soil,
[20] for example. It applies to many, many groundwater
[21] contaminants, MTBE among them.

[22] **THE COURT:** So, it could be really any contaminant
[23] that's not biodegrading.

[24] **THE WITNESS:** That's right.

[25] **THE COURT:** So a generic contaminant.

[1] **MR. STACK:** Objection, your Honor. Which area are we
[2] talking about?
[3] **THE COURT:** In the area of Station 6, right?
[4] **MR. STEIN:** Yes, your Honor. The area of Station 6 in
[5] the geographic area of Queens County depicted on the maps.
[6] **A.** If the wells are pumping, then MTBE plumes that are in the
[7] zone that contributes water to the well, then they'll be pulled
[8] towards the well.
[9] **Q.** When the wells are pumping, would you expect MTBE plumes to
[10] migrate down into the bay to discharge into the ocean?
[11] **A.** Not if the plumes are up in this region here, no.
[12] **Q.** And so how -- at some point those MTBE plumes will
[13] disappear, correct?
[14] **A.** Could you clarify?
[15] **Q.** How are those MTBE plumes going to get out of the water
[16] when all those public supply wells are on?
[17] **A.** Well, at that point, the main exit for the plumes would be
[18] the wells.
[19] **THE COURT:** And what does that mean?
[20] **THE WITNESS:** That means when the wells are pumping
[21] and drawing the plumes towards them, there's really no other
[22] exit or a point or a mechanism for the groundwater to get out.
[23] Essentially it's all, with this condition here in that region
[24] that's depicted, all the groundwater is flowing towards the
[25] wells.

[1] **THE COURT:** So it would be sucked up into the well,
[2] come out when the water is drawn from the well?
[3] **THE WITNESS:** That's right. It's only a matter of
[4] time.
[5] **Q.** You've heard about recharge before. What is recharge?
[6] **A.** Recharge is water usually from precipitation that gets into
[7] an aquifer and replenishes the aquifer. So that's why,
[8] recharge sustains aquifers. If you cut off recharge, like if
[9] you're in the outer common desert with almost no rainfall,
[10] there's almost no recharge there.
[11] **Q.** Would recharge cause the rain to move towards this area
[12] when the wells are pumping?
[13] **A.** No. Basically, the map you see here is reflecting the
[14] groundwater system and it's also reflecting the effects of
[15] recharge. If there were no recharge, this hole here, this
[16] decline in water levels would be even greater.
[17] **MR. STEIN:** If we could take the slide down, please?
[18] **Q.** Dr. Fogg, what is your opinion of how long plumes of MTBE
[19] will persist in the Brooklyn/Queens aquifer?
[20] **A.** My opinion is that, as I said Friday, it's at least
[21] decades, and based on my experience looking at groundwater
[22] systems like this all over the world over the past 34 years, I
[23] know of no groundwater contaminant that moves like MTBE and
[24] resists biodegradation like MTBE that has gotten into
[25] groundwater systems that is not still present at least 40 years

[1] later. We have a lot of examples from other chemicals that
[2] were introduced in the '40's and '50's. I don't know of a
[3] single case -- let me qualify that with one more thing -- for a
[4] single case of chemicals like this getting into any groundwater
[5] system and the chemicals are not being remediated, remediated
[6] meaning we're trying to do things at every place we know the
[7] chemical is to get it out of the ground and we're getting it
[8] out of the ground, I don't know of any case where those
[9] chemicals have just disappeared on a time period of 40 years.
[10] So this system, there's nothing different about it that would
[11] make it an exception to that type of rule or observation. So I
[12] would say that it's most likely that the MTBE will be around
[13] and measurable at problematic levels for at least 40-odd years
[14] since the ban of MTBE.
[15] **MR. STEIN:** No further questions, your Honor. Thank
[16] you, Dr. Fogg.
[17] **THE COURT:** All right, thank you, Mr. Stein.
[18] **MR. STACK:** Your Honor, I'm going to provide a copy of
[19] the binder for cross-examination with the caveat that we most
[20] likely will not go through all of these.
[21] **CROSS-EXAMINATION**
[22] **BY MR. STACK:**
[23] **Q.** Good morning, Dr. Fogg. How are you today?
[24] **A.** Fine, sir. How are you?
[25] **Q.** Good. With respect to the topics you covered this morning,

[1] I'd like to touch on quickly a couple issues and then we'll
[2] turn to some other subjects. First and foremost, in the past
[3] 15 years has your opinion regarding the biodegradation of MTBE
[4] changed?
[5] **A.** Yes.
[6] **Q.** 15 years ago you didn't think it biodegraded under any
[7] circumstances, am I correct?
[8] **A.** The literature, my interpretation of what would happen was
[9] a reflection of the literature at that time, and the literature
[10] at that time showed that there was very, very precious evidence
[11] of biodegradation. Actually, you could say the same thing
[12] about the current literature. But there was even less
[13] evidence, say, 15 years ago.
[14] **Q.** And the current literature -- if you wish to refer at any
[15] time to any of the articles that you cited in your report,
[16] that's why I gave you the binder, among other things.
[17] **A.** Thank you.
[18] **Q.** You do now acknowledge that MTBE can biodegrade in
[19] groundwater under certain conditions?
[20] **A.** Yes.
[21] **Q.** And with respect to the certain conditions you talked about
[22] in discussing aerobic biodegradation, that aerobic and
[23] anaerobic biodegradation create a chemical called TBA,
[24] tert-butyl alcohol, am I correct?
[25] **A.** Yes.

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[1] terms of totally dealing with the MTBE problem, no, no cleanup
[2] totally dealt with the MTBE problem.
[3] **Q.** Do you have an opinion about why it is so common in the
[4] area around Station 6 to see releases involving MTBE so
[5] inadequately handled?

[6] **MR. STACK:** Objection, your Honor. The question was
[7] asked of this witness numerous times. He calculated lag time,
[8] according to his deposition, and I believe if you look at it
[9] here he never questioned causation or why.

[10] **MR. SHER:** Your Honor, I don't understand the basis
[11] for the objection.

[12] **MR. STACK:** It's beyond of scope of his designation,
[13] beyond the scope of his report and there's a lack of foundation
[14] and it's irrelevant.

[15] **THE COURT:** I think Mr. Stack might be right on all
[16] those points.

[17] **MR. SHER:** I respectfully disagree with him, and, your
[18] Honor, the expert has been proffered as an expert in this
[19] field. He has examined these sites and he is explaining to the
[20] jury why it is that such breakdowns in cleanup are so common,
[21] and he derived those opinions from the files he reviewed.

[22] **THE COURT:** There's a disconnect between what the two
[23] of you are saying that's confusing me. That's what's confusing
[24] me right now. Mr. Stack is saying he was not proffered as a
[25] expert in causation. What you just said had nothing to do with

[1] **MR. STACK:** Thank you, your Honor.

[2] **A.** My answer is fairly general, so I think it's --with what we
[3] just said. In my view, and I would say this more broadly than
[4] Station 6, I would say that many practitioners, including
[5] myself, got used to dealing with gasoline compounds before
[6] MTBE. We have a lot of experience with those and we know what
[7] to do. Just like Dr. Walsh said, we know what to do with those
[8] things. And when MTBE was introduced for a lot of folks, I
[9] mean, there's a time delay between recognizing that look, we
[10] have something brand new to deal with and we have to deal with
[11] it philosophically in the same way, but reaction times need to
[12] be much different. So at least in my view from what I have
[13] reviewed and seen not only here in Station 6 but elsewhere, the
[14] pattern of inadequacy is partly a reflection of what we were
[15] used to doing for many years that was just fine at that time.

[16] **THE COURT:** Well, what's the inadequacy?

[17] **THE WITNESS:** Well, the inadequacy is what we would do
[18] in past years for non-MTBE releases is too slow and not
[19] distributed geographically enough to deal with the MTBE
[20] problem. It is fast enough and geographically distributed
[21] enough to deal with benzine and other types of things like that
[22] that don't travel as fast or as far.

[23] **Q.** So in summary, Mr. Beckett, you found applied environmental
[24] actions --

[25] **THE COURT:** You what?

[1] causation. So there's a disconnect with what the two of you
[2] are saying.

[3] **MR. SHER:** I'm a little at a loss. The expert has
[4] been testifying to the adequacy of steps that were taken at the
[5] sites he reviewed and I'm asking him whether he has an
[6] explanation for why so many of them were inadequate. That's
[7] all.

[8] **MR. STACK:** And in terms of the explanation, your
[9] Honor, I asked him questions at his deposition. He told me all
[10] I did was calculate when the spill report occurred and when the
[11] last cleanup action was undertaken. When I asked him whether
[12] or not he had any opinion as to why that delay occurred, he
[13] told me he had not looked into it.

[14] **THE COURT:** And maybe he's not going to try to explain
[15] why the delay occurred, just that what did occur was adequate
[16] to solve a problem.

[17] **MR. STACK:** And, your Honor, I believe the adequacy
[18] question goes to the causation. Why did this happen, and he
[19] did not form an opinion in that regard.

[20] **THE COURT:** Maybe the adequacy question goes to what's
[21] still there, which is the phase two question, whether and what
[22] is still there. Is that what you're driving at, Mr. Sher?

[23] **MR. SHER:** Yes, your Honor. Yes, it is.

[24] **THE COURT:** That is a phase two question. I'll allow
[25] it because it's directed solely to that.

[1] **Q.** You found the actions that were applied to the site around
[2] Station 6 that you reviewed to be inadequate for MTBE at
[3] virtually all the sites you reviewed?

[4] **MR. STACK:** Objection, your Honor.

[5] **THE COURT:** Sustained. I didn't hear him say that.
[6] You're saying it.

[7] **Q.** I'm sorry. Did you reach a conclusion with respect to the
[8] sites that you reviewed around Station 6 concerning the general
[9] adequacy of actions with respect to MTBE?

[10] **A.** Yes. I think we kind of covered it a little before, is
[11] that in general, with some exceptions, that the
[12] characterization and the remediation actions were inadequate to
[13] protect the groundwater resource from impacts from MTBE.

[14] **THE COURT:** Inadequate again in what sense?

[15] **THE WITNESS:** Inadequate that MTBE impacts are
[16] widespread throughout the system, inadequate that MTBE plumes
[17] are not delineated and not characterized as downstream and
[18] sometimes a vertical area.

[19] **Q.** And do you have an opinion with respect to the adequacy of
[20] protecting the drinking water resource around Station 6?

[21] **A.** Well, yes, I think that's part and parcel to that
[22] statement. That, in other words, it is because the groundwater
[23] drinking resource has not been protected that I think that
[24] what's been done has been generally inadequate over all.

[25] **Q.** Let's turn, we're only going to discuss three specific

[1] So, when I say remediation could be partially
 [2] effective, it may have had an effect up here, but you can see
 [3] that there is MTBE going right past this well location after
 [4] that clean-up stop. So, did it fix the MTBE problem? In my
 [5] mind, no. So that's all this slide shows. We can go past it
 [6] now.
 [7] **Q.** Let's go to the next slide.
 [8] **A.** This is the one that gets to the question you just asked.
 [9] It's very hard to read these boxes. I apologize. I don't draw
 [10] these figures; I take them from the reports. But in I think
 [11] 2005 -- we will look at the table in just a second -- this
 [12] location was installed here. The bottom-most number, which you
 [13] can't read, so I have annotated, is MTBE, and it's at 857 parts
 [14] per billion.
 [15] **Q.** Remind us what we are looking at on this map. Where is the
 [16] gas station?
 [17] **A.** This is the gas station here.
 [18] **Q.** Where are the tanks?
 [19] **A.** The tanks are here, Parsons, and 84. So this is the area
 [20] we have been looking at in the other maps we just covered. So
 [21] off-site here in the downstream direction we get a location,
 [22] and it has 857 ppb in 2007 of MTBE. So you asked before did I
 [23] think it went off-site. I know it went off-site, and I also
 [24] know that we don't know how much further off-site it is at this
 [25] particular point in time.

[1] party.
 [2] **THE COURT:** I see. OK.
 [3] **MR. SHER:** OK. Next slide, Liz. Can you go back to
 [4] the table for 26D?
 [5] **THE WITNESS:** OK. So there are several things
 [6] important about 26D. I know this is hard to go through every
 [7] piece of it, but it's deep, so that's the first thing.
 [8] **Q.** What's the significance of it being deep?
 [9] **A.** It's in the regional groundwater is what I would interpret
 [10] it to be.
 [11] **Q.** And why is that significant?
 [12] **A.** That's at least some of what the city wells would be
 [13] pumping from.
 [14] OK. So you can see the record from June of 2005
 [15] forward to September of '07. You can see over here -- by the
 [16] way, this highlighting was done by the consultant, not by
 [17] myself, and I think it signifies the contaminant levels in gray
 [18] are above whatever they call the guidance values, DEC guidance
 [19] values.
 [20] So, you can see throughout the period of record that
 [21] MTBE is high at this location -- 28 all the way into the
 [22] 900s -- but the interesting thing to me, and a little bit
 [23] disturbing on this particular site, is we have said time and
 [24] time again that generally Benzene, Toluene and all those other
 [25] things don't go very far. They usually don't. You can't

[1] **Q.** Let's have the next slide, please.
 [2] **A.** This is the sampling record for that location. It's called
 [3] 26D, like David. I believe D stands for deep. The depth of
 [4] groundwater is 110 feet. That's deep. The depth of
 [5] groundwater on the site we were just looking at was 10 to 20
 [6] feet. 10, this is a well I believe put into the deeper more
 [7] regional aquifer, the one we would be concerned with from a
 [8] city drinking water perspective.
 [9] **THE COURT:** Where is that monitoring well?
 [10] **THE WITNESS:** It was on the preceding map, and I will
 [11] show you again if we can go backwards one. That is this
 [12] location right here.
 [13] **THE COURT:** Do you see the monitoring well?
 [14] **THE WITNESS:** It's difficult to see. That's why I
 [15] highlighted it with the an notation.
 [16] **THE COURT:** So, it's right there though.
 [17] **THE WITNESS:** It's right there, that's correct.
 [18] **THE COURT:** OK. Who put in that monitoring well, do
 [19] you know?
 [20] **THE WITNESS:** From recollection I believe this map was
 [21] generated by the consulting company Kleinfelder, but I would
 [22] have to --
 [23] **THE COURT:** I don't mean the map, but who puts in that
 [24] monitoring well?
 [25] **THE WITNESS:** The consultant for the responsible

[1] assume they don't though. That's part of our job as
 [2] environmental protectors and so forth. And what you see here
 [3] for this sight, Toluene, Ethylbenzene, Xylenes, the BTEX got
 [4] not only off-site but they got down to the groundwater 110 feet
 [5] below ground.
 [6] **Q.** What is the significance of that with respect to MTBE in
 [7] that area?
 [8] **A.** Well, again all that one can say definitively is that we
 [9] don't know what happened to MTBE. It traveled at least this
 [10] far, and my interpretation based on what I have seen here and
 [11] elsewhere, is it traveled further. We just don't know where or
 [12] any of the details because it's not characterized.
 [13] **Q.** Do we know whether the 870 odd parts per billion that was
 [14] reported in 26D that you showed us on the other graphic is the
 [15] highest concentration that is off-site?
 [16] **A.** No.
 [17] **MR. STACK:** Objection. Calls for speculation.
 [18] **THE COURT:** No, it doesn't. That would be reported.
 [19] Is that the highest reported value off the site?
 [20] **THE WITNESS:** This is the highest reported value.
 [21] **THE COURT:** Where is that number? You said 870?
 [22] **THE WITNESS:** It is -- 941 I think is the highest in
 [23] this table.
 [24] **THE COURT:** Right. That was June 21, '07.
 [25] **THE WITNESS:** Correct.

Page 1805

[1] Q. Can you go to tab D, please, Plaintiff's 10406? You don't
[2] have that? Okay, we'll move on.
[3] Now, based on your review of these records,
[4] Dr. Beckett, have you reached some conclusions concerning the
[5] adequacy of site investigation and remediation of this site?
[6] A. Yes.
[7] Q. Have you prepared some demonstrative slides to explain to
[8] the jury the basis for your opinions?
[9] A. Yes, I have.
[10] Q. Can you pull up the first one, please? Is this one of the
[11] slides you prepared?
[12] A. It is. I think it's the site map we just looked at a
[13] minute ago. The site map itself is from 1996, but I just
[14] annotated up here that the wells were installed -- remember we
[15] looked at that table in 1994. Just so the dates are square.
[16] At this time in this 1996 record, these wells here had
[17] free product in them, floating gasoline, and we see high levels
[18] of impacts distributed all across the site. You may remember
[19] one of the maps we looked at, we'll look at this again, that
[20] the flow direction for water was in the southeast. This is
[21] sort of north or, I'm sorry, if this is north, then the
[22] photograph shows directly to the south. North is not straight
[23] up in this particular map, so the flow direction is to the
[24] south.
[25] I just annotated this reddish box here to show the

Page 1806

[1] area where we don't know anything about the distribution of the
[2] impacts or contamination at this time.
[3] So 1996 we have spill reports that at least I could
[4] identify from December 1988, '94 and so on. So here in 1996
[5] this is the extent of our understanding and we don't yet
[6] understand what might be downstream of those sites.
[7] Q. Just for clarity, the spill reports listed there are
[8] collected directly behind tab 2, am I right? You reference
[9] them in tab 2?
[10] A. The ones that we started, that's correct.
[11] Q. So those provide a basis for this statement here that there
[12] were spill reports as of that date?
[13] A. That's correct.
[14] Q. Why should we be concerned about the area that you've
[15] colored in purple below, to the south of the station, based on
[16] the information that you have here?
[17] A. Perhaps we can zoom in just to this area for a minute.
[18] Thank you. You could see that at these particular locations,
[19] all three of them are informative. We've got, and it's not
[20] easy to read, I'm going to say that's probably 37200 for MTBE
[21] there, 18,000 there, 3500 there. This area here below us to
[22] the south is downstream. So this tells me that there are high
[23] contaminant impacts on the site and we don't know what's off
[24] site.
[25] Q. More likely than not, do you believe that as of the date

Page 1807

[1] those measurements were taken that there was MTBE already off
[2] site?
[3] A. Yes, I think so.
[4] Q. Go zoom back to the slide, please. Any other conclusions
[5] that you used that you want to describe for the jury on this
[6] slide?
[7] A. Well, nothing other than that you can see that the numbers
[8] are high. They're variable like always, but we have free
[9] product here and here. We have high impacts all around the
[10] site. To me this looks like a large spill. It covers the
[11] whole footprint of the site as best that we can see. In all
[12] likelihood it stems off site as well.
[13] Q. Do you have any information from which you're able to
[14] derive any estimate of the actual size of the spill or the
[15] release, rather?
[16] A. No, I have none.
[17] Q. Do you know whether it was a spill or a leak?
[18] A. Well, we can go back to the spill reports and look at the
[19] various things that might have occurred and were reported, but
[20] again, those are the things that are reported. Whether this
[21] was generated by things that were reported or whether this was
[22] generated by things that perhaps weren't reported, we can't be
[23] positive of that.
[24] Q. Can we have the next slide, please?
[25] A. And we already looked at this, and we can probably go on.

Page 1808

[1] It just shows that as of the first sampling in 1994, the MTBE
[2] impacts were recognized at this level as high as 86,000 parts
[3] per billion.
[4] Q. Next slide, please?
[5] A. This map shows, and we've looked at this previously, again
[6] the groundwater flow direction is going this way to the south.
[7] It shows now that by 2002, early 2002, if my memory is correct,
[8] we do have a few off-site wells located down here to the south
[9] of the service station. At this location we have free product
[10] gasoline found floating in that well, and eventually they'll
[11] actually install a cleanup system off site because there's
[12] enough contamination off site that that was felt to be
[13] necessary and we have high impacts of contaminants off site as
[14] of this time. So we suspected in 1996, based on the map you
[15] just looked at, that there were probably impacts off site and
[16] this map confirms. There are and, again, we don't know how
[17] much further they extend downstream to the south.
[18] Q. Can you enlarge the row of boxes just north of where the
[19] purple area is? All right. Where are MTBE results represented
[20] in these figures?
[21] A. It's the -- I don't know. I'd have to go back to the
[22] report.
[23] Q. Is it based on your analysis this shows contamination of
[24] MTBE along with other contaminants at that site?
[25] MR. STACK: Objection, your Honor. He just said he

[1] where spill reports were that I could find starting in 1996
 [2] through 2002. The groundwater flow direction again is here
 [3] sort of to the south and southwest. This is monitor well 1 and
 [4] I've just annotated out here that in the downgradient flow
 [5] direction this site is not delineated as of this time. In
 [6] fact, as of any time within the records I reviewed.
 [7] **Q.** To your knowledge, was the downgradient that is off-site
 [8] the extent of the MTBE plume investigated at any time for this?
 [9] **A.** Within the records I reviewed, no. Many of my records
 [10] stopped at a certain -- well, all records stop at a certain
 [11] point in time. But I think my understanding is that MTBE fuel
 [12] delivery stopped in 2004, and sort of by that time, anything
 [13] else that happens is well after. It's not after the time
 [14] period of concern, but my focus was primarily prior to that,
 [15] although I did look at things after that. So, in other words,
 [16] this site was not characterized in the data that I reviewed as
 [17] of the times I have.
 [18] **Q.** Let's go to the next slide, please. SVA and air sparging
 [19] applied to this site in August of 2004, is that correct?
 [20] **A.** That's correct.
 [21] **Q.** Next slide, please?
 [22] **A.** This site is again, the monitoring, sampling records for
 [23] MW1. All I really wanted to show you is we could see that the
 [24] MTBE has various values, but in general they are starting to
 [25] get lower from the 31,000, and when the air sparging and soil

[1] vapor extractions system started up, the value for that well is
 [2] non-detect. And at the same time that the MTBE is non-detect,
 [3] you can see that the BTEX values are still high.
 [4] **Q.** What does that signify to you?
 [5] **A.** Well, we talked about a few times that MTBE moves out of
 [6] gasoline faster than other things like BTEX and to me this
 [7] shows us exactly that. Here is the BTEX, it's present still at
 [8] high levels, 10,700 and MTBE is non-detect. It tells me that
 [9] MTBE has already moved through and in all likelihood off site
 [10] by this period of time.
 [11] So remediation has started, but this is another good
 [12] example of something started too late to be useful.
 [13] **Q.** Do you have an opinion more likely than not whether MTBE
 [14] from this source at this gas station has moved off site?
 [15] **A.** Yes, given everything I've seen, I believe it has moved off
 [16] site.
 [17] **Q.** We talked about three particular gas stations that you
 [18] investigated of the 23. Can you describe for the jury how
 [19] those three analyses were typical?
 [20] **A.** May I rephrase that slightly? I would say that every site
 [21] is different, just like every patient is different, but there
 [22] are certain patterns that we see. The things that were typical
 [23] or I guess that I saw commonly, was that for any site with high
 [24] MTBE impacts like the few that we just looked at, we don't know
 [25] how far they went, we don't know how deep they went and we

[1] don't know when they got there.
 [2] **Q.** By they, you mean MTBE?
 [3] **A.** Yes, MTBE. When it got there. Yes, that's correct. So
 [4] that's similar and then for all the sites, again, with
 [5] significant impacts of MTBE, you saw that remediation was done
 [6] at some sites and had some good locally, but in terms of
 [7] fixing, correcting, corralling, drawing back in site the MTBE,
 [8] there was no case that was effective.
 [9] **Q.** The South Conduit site that we looked at there was some
 [10] off-site vertical delineation. Do you recall that?
 [11] **A.** Yes, I do.
 [12] **Q.** Did you see any other sites -- we also saw some vertical
 [13] delineations on Parsons, right, where we had the one monitoring
 [14] well that was across the street from monitoring well 26D, is
 [15] that right?
 [16] **A.** That's right, yes.
 [17] **Q.** Did you typically find as you looked at the sites that
 [18] there was off-site vertical delineation?
 [19] **A.** Well, off-site vertical delineation happened more rarely
 [20] than commonly in the sites that I reviewed. It was present at
 [21] some sites and you just described two out of the three that we
 [22] looked at where there was at least some vertical delineation.
 [23] In terms of complete vertical delineation, meaning do we really
 [24] know where the bottom is, where's the floor of this, no, I
 [25] didn't see any site that really defined the true bottom of

[1] contamination.
 [2] **Q.** Did you see any sites where the true lateral, that is,
 [3] distance from the source, was delineated?
 [4] **A.** No.
 [5] **MR. SHER:** I have no further questions.
 [6] **THE COURT:** Good timing. We'll take our lunch recess
 [7] now and reconvene at 2:00. The jury is excused.
 [8] (Jury excused)
 [9] (Luncheon recess)

Page 1893

Page 1895

[1] **MR. SHER:** Your Honor, I'd like to proffer Mr. Terry
 [2] as an expert in hydrogeology, computer modeling, transport of
 [3] MTBE and predicting treatment impacts of contaminants on public
 [4] water, including MTBE.
 [5] **MR. STACK:** Your Honor, I will not object at this time
 [6] and reserve for cross-examination.
 [7] **THE COURT:** Okay.
 [8] **MR. SHER:** Let's take the slide down.
 [9] **Q.** Did you use computer modeling in your work on this case?
 [10] **A.** Yes, I did. I used two different models.
 [11] **Q.** Let me back up a second. What was your assignment in this
 [12] case?
 [13] **A.** The assignment in this case was that New York City plans to
 [14] build a treatment plant to remove MTBE from water at Station 6,
 [15] and so what I was asked to do was to determine how much MTBE is
 [16] at Station 6 and what the maximum concentration is likely to be
 [17] when it's turned back on, and then how long it's going to last.
 [18] **Q.** And did you use the computer model in answering those
 [19] questions?
 [20] **A.** Yes, I did.
 [21] **Q.** And how did you do that?
 [22] **A.** I used two different models. I used one we call a
 [23] groundwater flow model and that tells us where the groundwater
 [24] flows, how fast it moves, things like that. That model was
 [25] actually a model that was developed originally by the U.S.

[1] at Station 6 in the future when it's turned on. So we wanted
 [2] to know what the peak concentration of MTBE would be at the
 [3] wells when they turn on and also how long that contamination
 [4] would last.
 [5] **Q.** What conclusions did you reach, based on your analysis in
 [6] this case?
 [7] **A.** From running the models, I concluded that the peak
 [8] concentration of MTBE at the Station 6 treatment plant would
 [9] reach about 35 parts per billion, and that contamination would
 [10] persist at the treatment plant at least three parts per billion
 [11] or more until the year 2040.
 [12] **Q.** And did you reach a conclusion about what year this peak of
 [13] 35 parts per billion would be reached?
 [14] **A.** Well, I conducted a modeling analysis to investigate that
 [15] question and my model shows it around about the year 2024, give
 [16] or take.
 [17] **Q.** Now, I'd like to step back and have you explain to the jury
 [18] step by step how you reached these conclusions. What was the
 [19] first step you took in understanding the future impacts on
 [20] Station 6 of MTBE?
 [21] **A.** Okay, well, the first thing that you want to know when
 [22] you're trying to address a question like this is where is the
 [23] water coming from that will be pumped at Station 6. Because
 [24] there's an area, a capture zone you've heard about before, an
 [25] area underground where water will flow to Station 6 in the

Page 1894

Page 1896

[1] Geological Survey, which has been studying the hydrogeology in
 [2] this area for a hundred years or more, and they've put this
 [3] model together to describe groundwater flow underneath Queens.
 [4] They've used the model to address a lot of different questions,
 [5] things about salt water intrusion into the aquifer and the
 [6] effects of pumping on the aquifer over time.
 [7] We took that model and we adapted it and we used that
 [8] model as the flow model in this project.
 [9] We also used --
 [10] **Q.** With respect to that model, is that a generally accepted
 [11] model for evaluating the flow of water in the Queens aquifer?
 [12] **A.** Yes. This model was developed by the U.S. Geological
 [13] Survey. It's an arm of the federal government and they've peer
 [14] reviewed and tested this model, so it's a widely accepted
 [15] model.
 [16] **Q.** What other form of model did you use in this case?
 [17] **A.** The other model we used is called a transport model. That
 [18] model really rides on top of the flow model. That model
 [19] describes how contaminants move through the groundwater system.
 [20] So the flow model is actually describing the flow of
 [21] groundwater from place to place and the transport model is sort
 [22] of describing on top of that how the contamination moves
 [23] through the system.
 [24] **Q.** And what did you use these models for in this case?
 [25] **A.** Well, in this case we were looking to see what would happen

[1] future when it's turned on, so if there are sources of
 [2] contamination in that area, those are the sources that
 [3] potentially can affect water quality at Station 6 in the
 [4] future. So the first question really is to understand where is
 [5] this capture zone for Station 6 so we can look and see what
 [6] sources of contamination are present there.
 [7] In order to do that analysis, I used the groundwater
 [8] flow model and I've put together some slides, some
 [9] demonstrative exhibit that shows the results of my effort.
 [10] **Q.** How did you develop the capture zone in terms of your
 [11] assumptions about when wells would be pumping and which wells?
 [12] **A.** Well, I got a schedule of how wells planned to be pumped,
 [13] from consultants that are water planners for the City of New
 [14] York. So they gave me what was the proposed pumping scenario
 [15] for all these wells in the Queens area. I say the Queens area.
 [16] We really can't look at Station 6 by itself because there are
 [17] other wells near Station 6, and when those wells pump they
 [18] affect the water flow direction at the wells near Station 6
 [19] also. So rather than looking at just how Station 6 will
 [20] operate, you also have to look at how the other wells will
 [21] operate.
 [22] **Q.** Did you prepare a slide illustrating the time line with
 [23] these various assumptions regarding the wells that you modeled?
 [24] **A.** Yes, I did.
 [25] **Q.** Could you turn to tab 2 in the binder?

In The Matter Of:

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EXXON MOBIL CORPORATION, ET AL*

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[1] jury yet. Bring it up so counsel and the judge can see it.
[2] PL23233.
[3] Your Honor, this is -- I can ask Mr. Terry to explain
[4] it if you prefer.
[5] Mr. Terry do you have tab 5 in front of you?
[6] A. Yes, I do.
[7] Q. Can you explain what this is?
[8] A. Yes. This is a table that was made from a database of
[9] water quality data about samples collected at the Station 6
[10] wells.
[11] MR. SHER: Now, your Honor, the source for this is a
[12] database that the parties have stipulated is in evidence, and
[13] this is an extract from that database.
[14] THE COURT: Then there shouldn't be any objection. Is
[15] there, Mr. Stack?
[16] MR. STACK: There is none, as well as the four is
[17] explained. There are many columns on it.
[18] THE COURT: He will.
[19] Q. This is in evidence. Now bring it up for the jury.
[20] Can you explain what the first column on the left is
[21] in this table, Mr. Terry?
[22] A. Yes. That is labeled sample date, and that is the date
[23] that a sample was collected from the well in question.
[24] Q. So this particular page shows wells 6, 6A and 6B. Do I
[25] have that right?

[1] A. That's right.
[2] Q. If you can flip to the second page of the exhibit.
[3] A. There is 6D.
[4] Q. There is 6D. And then at the bottom, 33.
[5] OK. Let's go back to the first page, please. What is
[6] the second column in this table?
[7] A. Well, the second column is labeled MTBE result value. The
[8] one thing to notice about that column is that there are numbers
[9] in that column, but just because there is a number there
[10] doesn't necessarily mean MTBE was detected.
[11] Q. On this table?
[12] A. Yes. If we look over here on the fourth column there is a
[13] couple of places that says detection, no. So in that case that
[14] minus one stands for less than one. So where you see no there
[15] was no detection, it's a less than, here less than 22, here
[16] less than .22, here less than .5.
[17] MR. STACK: Can I have just a moment? There appears
[18] to be just a different document behind tab 5.
[19] MR. SHER: It is different. 4.
[20] Your Honor, I apologize. We will come back in a
[21] little bit.
[22] THE COURT: You could use the Elmo. Then you can just
[23] keep going.
[24] MR. SHER: Excellent idea.
[25] THE COURT: Especially if you remember how to turn it

[1] on.
[2] MR. SHER: Well, that is a challenge.
[3] THE COURT: Yes. Well, it's not hard. There you go.
[4] That's the exhibit you want. OK, that's it.
[5] Q. OK. So this is a copy of the correct 23233, and,
[6] Mr. Terry, this version of it only includes the confirmed
[7] detections, is that right?
[8] A. That's my understanding, yes, that in this table where it
[9] said "no" in that column, those lines do not appear.
[10] Q. OK. What is the column --
[11] MR. STACK: Your Honor, I would object. The
[12] stipulation that we had was for all of the data, not just the
[13] detections. There are numerous tests that there were no
[14] detections.
[15] THE COURT: Well, you can show that on cross. There
[16] is no problem. You can show that chart with all the nos. But
[17] he wants to go over this one now. That's fine.
[18] MR. SHER: Yes.
[19] Q. What is the third column?
[20] A. That's labeled result units, and it says -- it has a little
[21] symbol ug/L. That means micrograms per liter, or parts per
[22] billion.
[23] Q. And the sample type?
[24] A. It says raw water, so that means it's a water sample
[25] directly from the well. Sometimes water systems collect

[1] samples of water after it's pumped and treated, and that's
[2] water that they are going to deliver to the customers. This is
[3] a raw water sample directly from the well itself.
[4] Q. Now, the last three columns, your Honor, I will represent
[5] that pursuant to the stipulation, the agreement was that any
[6] results shown to the jury would include the sample result code,
[7] the Pirnie sample code and the lab sample code. So, I can have
[8] the witness explain that, but I don't believe it's pertinent to
[9] our discussion.
[10] THE COURT: I would rather skip it, Mr. Stack. Do we
[11] need it?
[12] MR. STACK: I don't believe we need it at this point,
[13] your Honor. Thank you.
[14] Q. Now, with respect to the second page of the document
[15] showing wells 6D and 33, can you explain the significance of
[16] the highlighted number?
[17] A. That highlighted number says 350, so that's 350 parts per
[18] billion, and that was the result of an analysis of a sample
[19] that was collected from well 6D in January of 2003. This was
[20] during a pilot test for purposes of planning for the Station 6
[21] treatment plant.
[22] THE COURT: Was it highlighted because it's the
[23] highest value? Because that's the highest of all the values?
[24] THE WITNESS: It is the highest of all the values,
[25] that's correct.

Page 1976

THE COURT: OK.

Q. And what conclusions, if any, did you draw in terms of your analysis about MTBE contamination of the Station 6 wells from the data showing confirmed detects of MTBE in the water?

A. It's clear from reviewing the data that MTBE has impacted water quality at Station 6. It's been present in all of the Station 6 wells in the upper glacial aquifer at one time or another between 2000 and 2007, based on this information.

In addition to that, a high concentration of MTBE was detected at well 6D, of 350 parts per billion, and then MTBE was present all the way until 2007 at a slightly lower concentration, 77 parts per billion at that time, but it's still present as of the last time the well was sampled. So, that shows us that MTBE is present in the groundwater in the vicinity of Station 6.

Q. Were you able to derive any conclusions about the frequency of detections in the wells from the data that you reviewed with respect to MTBE at Station 6?

A. Well, MTBE is detected, you know, every time at well 6D and numerous times at other wells as well, so it's been a prolonged event at these wells.

Q. Now, other than the Station 6 wells, what other information did you examine in assessing the impact of MTBE on the Station 6 wells?

A. Well, on that map that we were showing earlier I had --

Page 1977

MR. SHER: Let's bring up 14844A.

A. I should point out that these circles, they are almost circles, are radiuses -- radial distance or a distance away from Station 6. So that first circle that we are seeing there where it's white in the middle, that's at a distance of half a mile from Station 6. So first --

Q. Excuse me. Before you move on, yesterday Mr. Stack showed us a map with a perfect circle drawn around the Station 6 wells. Why is your area not a perfect circle?

A. Well, this is a distance from any of the Station 6 wells, so over here, because well 33 is one of the Station 6 wells, but it's kind of offset to the west a little bit, that's why the circle kind of bumps out here. And similar, you know, the wells are oriented this way, so it's not perfectly circular over here either. This is just a distance from any one of the Station 6 wells.

MR. SHER: Liz, could you enlarge the white circle.

A. So the next piece of information that we looked at was in the vicinity of Station 6, and there are three gasoline stations that are located in close proximity, you know, a few blocks from Station 6 that have known gasoline discharges and that have known MTBE releases into the groundwater from those sites.

Q. What is the S6- three digit numbers? What do those represent?

Page 1978

A. Those are just identification numbers that we assigned to different sites. There were a lot of different sites that we looked at, and so we just assigned numbers so we could identify and track them.

Q. Can you tell the jury which those three gas stations are?

A. Yes, this S6-010 is a Citgo station, this S6-019 a BP Amoco station, and this S6-030 is called Atlas. It's a private independent gasoline station.

Q. What about the two gas stations down in the lower right-hand corner of the circle?

A. This is a BP Amoco station at 113-40 Merrick Boulevard, and this is a Mobil station at 113-21 Merrick Boulevard.

Q. And what did you conclude from discovering these sources in this proximity to Station 6?

A. Well, there is high concentrations of MTBE associated with each one of these gasoline stations. In addition to that, we also reviewed information about these wells that are labeled with the red dot with the X in it. And we just on this map, we just included well locations where MTBE was detected. There is actually some additional wells associated with the West Side Corporation investigation in this area, but these are wells where MTBE was detected in the groundwater. And at this particular well location right here, the intermediate well at that location had a concentration of 370 parts per billion of MTBE.

Page 1979

Q. Let's back up a second on this. Liz, could you bring up PL5487? This is tab 6.

Your Honor, this is in evidence, and that has been referred to with other witnesses.

Mr. Terry, is this one of the documents that you reviewed in your work on this case?

A. Yes, this is the result of work that was done for the West Side Corporation investigation. Those red dots with the X in them that I described to you before was installed as part of this investigation.

Q. To your understanding was the primary purpose of that investigation to discover and plot the location of PCE contamination?

A. That's right. They were mapping the locations where PCE was present in the aquifer because that's the contaminant that's of concern at that site.

Q. Have you familiarized yourself with how they went about determining where to place the wells with respect to that investigation?

A. Yes.

Q. And how was that?

A. Well, they are investigating in the downstream, the down gradient direction, the direction that groundwater would flow from the West Side Corporation site, and they are trying to learn how far out the PCE contamination extends from the West

Page 1980

[1] Side Corporation site.
[2] **Q.** We have heard the term nested wells. Were these nested
[3] wells?
[4] **A.** I think, yes, before I used the term cluster, but it's the
[5] same idea. Instead of just installing a single well to a
[6] single depth, they install more than one well, and then those
[7] different wells are installed at different depths in the
[8] aquifer, and at most of these locations there were three wells
[9] installed at different depths.
[10] **Q.** And did some of those wells discover MTBE contamination?
[11] **A.** Yes.
[12] **Q.** And did they discover -- in the wells that discovered MTBE
[13] contamination, were they discovered at all depths in the
[14] aquifer?
[15] **A.** They were discovered at different depths in different
[16] wells. What was interesting to me was that that well that I
[17] pointed out before at 370 parts per billion was in the
[18] intermediate depth level, so at that location the shallow well
[19] was either nondetect or very low concentration; but it was a
[20] much higher concentration down at the intermediate depth level.
[21] **Q.** Can you flip to table 7-1. It's Bates number ending in 47.
[22] Sorry. 547.
[23] **THE COURT:** It's in the book in tab 6.
[24] **MR. SHER:** That's right, it's the next page.
[25] **MR. STACK:** I think we are all on the same page.

Page 1981

[1] **MR. SHER:** Yes, except I want to be on that page. OK.
[2] **Q.** Can you describe what this table shows?
[3] **A.** Yes, I was just describing some results to you before.
[4] There has actually been two different times that samples were
[5] collected from these wells, and the most recent time, which was
[6] in 2009, at the well I was describing, they detected 370 parts
[7] per billion in that well that I pointed out. This table
[8] summarizes the results from an earlier sampling round in
[9] October of 2008, and at that time this well, number 15, which
[10] is the one I pointed out, had an MTBE concentration of 490
[11] parts per billion.
[12] **Q.** What is the significance of the NDs immediately above and
[13] below this reported value in this table?
[14] **A.** Well, ND stands for nondetect, so typically the lab that
[15] the sample is sent to will have some level that they can detect
[16] down to, and if they don't detect the presence of a contaminant
[17] at that level or higher, then they just say nondetect. It's
[18] sort of like a "less than" value.
[19] **Q.** Let's go to tab 7, PL5488. What is this document?
[20] **A.** This is the May 2009 report which summarizes the results of
[21] the 2009 sampling I was just describing at West Side
[22] Corporation off-site wells.
[23] **Q.** And is this one of the documents you also reviewed as part
[24] of your work on the case?
[25] **A.** Yes, I did.

Page 1982

[1] **Q.** Liz, if you will jump to table 3-1, please.
[2] **THE COURT:** What are the last digits of that Bates
[3] number?
[4] **MR. SHER:** It's 456 and 457, and it's 457 I want to go
[5] to. And enlarge the lower. There you go.
[6] **Q.** Mr. Terry, this is the 370 ppb detection that you were
[7] referring to?
[8] **A.** Yes, that's the value right is there.
[9] **Q.** Is that the same well from which MTBE was reported in the
[10] other report that we looked at?
[11] **A.** That's correct, the same well, 15I.
[12] **Q.** What does the J number mean, if you know, or the J letter
[13] mean with respect to some of the entries there?
[14] **A.** Well, a J value stands for an estimated value. So
[15] typically the laboratory will have a level they detect down to
[16] following a certain protocol, but usually or often times their
[17] instrumentation can actually see levels that are actually below
[18] that level, so they will report those levels but then they will
[19] indicate to the reader that this is an estimated value below
[20] our official detection limit.
[21] So, the laboratory knows that the compound is there,
[22] and they're giving you an estimate value since it's below what
[23] the protocol says. So, if I am looking at this, it's showing
[24] that there are J values for example at well 14. This could
[25] have been reported as ND, or you can look at these values which

Page 1983

[1] shows the presence of MTBE but it's just at lower levels than
[2] the detection limit.
[3] **Q.** And what is the significance in your opinion of the
[4] detection of MTBE at this well 15I in the midrange?
[5] **MR. STACK:** 15I, you mean?
[6] **MR. SHER:** Sorry. 15I.
[7] **A.** Well, the significance of this to me -- and I think on the
[8] previous page to this there is a bunch of values also that are
[9] J values -- is that we were looking for whether MTBE was
[10] present in the vicinity near Station 6. You know, is it in the
[11] groundwater? We know it's in the groundwater at Station 6
[12] because we saw the results for samples from the Station 6
[13] wells. Now we are looking just a little bit farther away from
[14] the Station 6 wells, and there is MTBE in the groundwater there
[15] as well.
[16] **Q.** Let's turn to tab 8 which is PL14844B. This is the same
[17] map we have been discussing only it's focused on a one mile
[18] radius rather than a half mile radius. Mr. Terry, how did you,
[19] if at all, use the information collected on this map in
[20] developing your opinion?
[21] **A.** Well, this is the same map we saw before, only now instead
[22] of looking at that half mile area around Station 6 wells, this
[23] shows us a one mile radius that's highlighted in the white area
[24] here.
[25] **Q.** Why did you consider potential sources that were a mile

Page 1984

[1] away?

[2] **A.** Well, when Station 6 pumps, its capture zone, as we saw

[3] yesterday, extends out away from the well, and so when it first

[4] turns on the water that's very close to the well field will be

[5] the first water that's pumped at Station 6, but as the Station

[6] 6 wells continue to pump into time, water will be drawn from

[7] further and further away from Station 6 wells.

[8] So, when we looked at the map before and we saw that

[9] there were sources of MTBE contamination, you know, close by,

[10] we saw that there was samples that showed MTBE close by, we

[11] know that when the well field first turns on it will be MTBE

[12] contamination. What we are looking for here is what about

[13] longer, what about after a certain amount of time and water is

[14] being drawn from further away.

[15] So, when we look at this map we can see that there

[16] are, you know, many gasoline discharges located by the red dots

[17] in this one mile radius area. So, not only are there sources

[18] of MTBE very close to the well field but there are also many

[19] sources that are farther away from the well field also.

[20] **Q.** If we could turn to tab 9, which is plaintiff's 14044C.

[21] It's the same map at a two mile radius.

[22] **MR. STACK:** If I may, I object only because I don't

[23] know which one of those circles is one mile or two miles. It

[24] wasn't clear to me in terms of the white area or the gray area.

[25] **THE COURT:** The white air area, the inner circle, it

Page 1986

[1] **A.** Not all of them do. The final capture zone I drew

[2] yesterday, which sort of extends south and west of the Station

[3] 6 well field is kind of in this area over here. So, this area

[4] to the north and east is not in that final capture zone of the

[5] Station 6 wells.

[6] **Q.** But remind us whether under the assumptions you used with

[7] respect to both the pumping of Station 6 and the other wells

[8] that you considered, whether the ultimate capture zone is

[9] achieved immediately upon turning on the wells.

[10] **A.** Well, as we saw yesterday, initially what happens in the

[11] time line that I modeled was that Station 24 turns on, and it

[12] has a capture zone in this area. When Station 6 first turns on

[13] in 2016 it has a capture zone extending in this area with the

[14] exception of the well 24 area. So what we can see from this

[15] map is if that's all that ever happened, if the dependability

[16] wells never turned on in 2020, that this capture area here has

[17] reported gasoline discharges even in that capture zone.

[18] Then of course after the dependability wells turn on,

[19] then the capture zone sort of shifts around, comes over in this

[20] way. But really in any of those scenarios there are really

[21] sources of MTBE in all different directions. We look at this

[22] map and in 360 degrees around here it's sources, it's just

[23] different sources depending on which pumping scenario is in

[24] play.

[25] **Q.** Did you consider any other sources of information in

Page 1985

[1] went from a half mile to a mile. Right? I thought he said

[2] that.

[3] **MR. SHER:** Well, let's go back and make sure I have

[4] that right. Let's go back to PL14844B.

[5] **A.** Well, in this diagram the white area is the one mile radius

[6] from Station 6.

[7] **Q.** So the outer one is how far away?

[8] **A.** Is a two mile radius.

[9] **Q.** And now go to 14844C. What does this show?

[10] **A.** Well, this is a map showing a one mile radius around the

[11] Station 6 wells, and the red dots again indicate reported

[12] gasoline discharge.

[13] **Q.** This is the two mile radius?

[14] **A.** Sorry, the two mile. I misspoke, sorry. This is the two

[15] mile radius around the Station 6 wells, and the red dots show

[16] the locations of reported gasoline discharges. And the ones

[17] that are circled in yellow are sites that we included in our

[18] modeling analysis.

[19] But what this showed me was that as we are working out

[20] now even farther away, two miles away from the well field, that

[21] there are even more sources of MTBE contamination located in

[22] that radius.

[23] **Q.** Do all of the sources or potential sources of MTBE shown on

[24] this map fall within what you concluded would be the ultimate

[25] capture zone for Station 6 over time?

Page 1987

[1] developing your opinions with respect to potential sources of

[2] contamination in the area of Station 6?

[3] **A.** Yes. The next thing I considered was a report by the New

[4] York State DEC about the presence of MTBE contamination at

[5] places where there are not reported gasoline discharges.

[6] **Q.** And let's bring up PL987, please.

[7] Your Honor, this is behind tab 10. This is previously

[8] been admitted into evidence.

[9] Can you tell us what this study is and how it was

[10] significant to your analysis?

[11] **A.** Well, this was a study that was performed on Long Island by

[12] the New York State DEC as part of a project that they did under

[13] the jurisdiction of the U.S. EPA. But what they were doing in

[14] this study was they went out into Nassau and Suffolk County on

[15] Long Island, and they looked at gasoline stations where there

[16] had not been any reported discharge of MTBE, and they conducted

[17] investigations of the groundwater at those places to see is

[18] there MTBE there or not. And what they found was that in many

[19] of those stations, even though there had not been a reported

[20] discharge of MTBE there was still MTBE found in the

[21] groundwater, and sometimes at significant concentrations.

[22] **Q.** Liz, could you jump to the page that Bates number ending in

[23] 810 and highlight the two bullets up at the top.

[24] The first bullet says MTBE exceeded the NYSDOH

[25] drinking water standard and NYSDEC groundwater standard of

Page 1988

[1] 10ug/L at 24 percent and 53 percent of sites investigated in
[2] Suffolk and Nassau Counties respectively.

[3] What did that mean to you, Mr. Terry?

[4] **A.** Well, as I said, DEC went out and they sampled these low
[5] locations, so at half of the sites they went to in Nassau and
[6] about a third of the sites in Suffolk County they did find MTBE
[7] in the groundwater in the vicinity of those gasoline stations
[8] at concentrations that exceeded the drinking water standard.
[9] So what they are concluding from this is that even though there
[10] hasn't been a reported discharge of gasoline at many places, it
[11] just maybe hasn't been found. And if you go look for it, they
[12] are finding it at a third to half of the sites, they're finding
[13] MTBE in the groundwater at levels that are of concern.

[14] I think another thing they concluded was that Suffolk
[15] County is somewhat less densely developed than Nassau County,
[16] so as we increase in the density of development, there were
[17] more leaks or more discharges detected in the more densely
[18] developed area.

[19] **Q.** And is Queens more or less densely populated than Suffolk
[20] County?

[21] **A.** Yeah, Queens obviously is much more densely developed than
[22] most of Nassau County.

[23] **Q.** The second bullet on the screen reads MTBE concentrations
[24] exceeded 5,000 ug/L at approximately 11 percent of sites in
[25] Suffolk County and 24 percent of sites in Nassau County.

Page 1989

[1] Just to remind folks, ug/L is equivalent to parts per
[2] billion, correct?

[3] **A.** That's correct.

[4] **Q.** And the sites that are being discussed in this study were
[5] those sites at which MTBE releases or gasoline releases had
[6] previously been known?

[7] **A.** That's right. These are the same locations. What they are
[8] saying here is if you look at all the sites, that half of them,
[9] for example, in Nassau County exceeded ten; and 24 percent of
[10] the total, about a quarter of the total, exceeded 5,000, which
[11] is a high MTBE concentration and would typically indicate a
[12] substantial release at a site.

[13] **Q.** But the sites that they are discussing, are they sites that
[14] had previously reported spills or leaks of gasoline?

[15] **A.** No there had been no reported discharges at these locations
[16] that were sampled.

[17] **Q.** And what did these study results tell you in terms of the
[18] work that you were doing in this case?

[19] **A.** Well, what we were doing in this part of our project was we
[20] knew where the Station 6 capture zone was and we were looking
[21] for whether there were sources of MTBE here, and I showed on
[22] the previous slide that there were places where gasoline
[23] discharges had been reported, and there were places where we
[24] know there is MTBE because groundwater had been sampled. But I
[25] think when looking at this study it is important to keep in

Page 1990

[1] mind that even though there is a lot of those sites, there is
[2] even more additional sites where there is gasoline stations
[3] that don't have reported discharges.

[4] **MR. STACK:** Objection. Move to strike. It's
[5] speculation on his part, offering opinions about releases for
[6] which there is no data whatsoever.

[7] **THE COURT:** That portion should be stricken.

[8] **MR. SHER:** Your Honor, the point of the study is that
[9] we don't know about these sites.

[10] **THE COURT:** I understand. That portion of his
[11] testimony should be stricken. Objection sustained.

[12] **Q.** Let's move on to the next slide, and again don't show this
[13] next one to the jury.

[14] Did you attempt to determine the number of reported
[15] underground storage tanks containing gasoline in the vicinity
[16] of Station 6 at which no spills or leaks had been reported to
[17] the DEC?

[18] **A.** Yes, we looked for sites where there was gasoline
[19] underground storage tanks which were present in the same
[20] database I referred to earlier, that toxics targeting database,
[21] as information about gasoline tank locations.

[22] **Q.** If you could bring up PL148438, please, and not show it to
[23] the jury yet.

[24] **THE COURT:** Is that one of the tabs?

[25] **MR. SHER:** Sorry, your Honor, it's behind tab 11.

Page 1991

[1] **Q.** Is this a map that you prepared as part of your work in
[2] this case, Mr. Terry?

[3] **A.** Yes, or my office prepared.

[4] **Q.** And on what did you base the data that goes into this map?

[5] **A.** Well, the toxics targeting database has information about
[6] the locations of registered tanks, and so this map is
[7] representing the locations where there is gasoline storage
[8] tanks but it omits those where there were reported discharges
[9] of gasoline.

[10] **Q.** And is the geolocator data for this information of the sort
[11] that you routinely and reliably use in the course of your work
[12] in these kinds of investigations?

[13] **A.** Yes, this information came from that toxics targeting
[14] database, so that included the locational information, which is
[15] the type of information we would typically rely on.

[16] **Q.** And do you consider it accurate for purposes of your work
[17] in this case?

[18] **A.** Yes, I do, to the best of my knowledge.

[19] **MR. SHER:** I would like to proffer this exhibit first
[20] as a demonstrative but also in evidence.

[21] **MR. STACK:** I would object simply on the basis we
[22] don't know looking at this map -- toxics targeting reports on
[23] all registered tanks. Some tanks on this map may have been
[24] taken out of service before MTBE was used in gasoline. Some
[25] tanks may be storing diesel, some heating oil.

Page 1996

[1] **THE COURT:** Is this Exhibit tab 12?
[2] **MR. STACK:** Yes, your Honor. The stipulation extends
[3] to documents submitted to government agencies.
[4] **THE COURT:** Well, but I think I remember this one. I
[5] remember we used it already.
[6] **MR. SHER:** It was used in part at least in the
[7] cross-examination of Dr. Fogg.
[8] **THE COURT:** No question, it was.
[9] **MR. STACK:** I did not use it.
[10] **THE COURT:** The reason I remember it, I just remember
[11] Haas and Sosik were familiar names, and it definitely was used.
[12] Does that ring a bell to you?
[13] **MR. STACK:** No.
[14] **THE COURT:** No, I remember this one. So I can't say
[15] whether at the time it was used it was in evidence, but it was
[16] definitely on the screen.
[17] **MR. STACK:** Your Honor, note my objection.
[18] **THE COURT:** Well, I'm not sure --
[19] **MR. STACK:** I do not believe it's in evidence, that's
[20] all I'm saying.
[21] **THE COURT:** Right, I realize that. Are you offering
[22] it in evidence?
[23] **MR. SHER:** I am.
[24] **THE COURT:** What is the basis for being able to offer
[25] it in evidence?

Page 1997

[1] **Q.** Is this document, A, that you reviewed in connection with
[2] your work in the case?
[3] **A.** Yes, it is.
[4] **Q.** And is it the type of article that you reasonably rely on
[5] in performing analyses of the sort that you performed in this
[6] case?
[7] **A.** Yes, I did rely on this paper.
[8] **THE COURT:** This one you did consider and rely on?
[9] **THE WITNESS:** Yes, I did, your Honor.
[10] **THE COURT:** Well, first of all --
[11] **MR. STACK:** I still object on the grounds it's
[12] hearsay.
[13] **THE COURT:** I know, but the rules permit that for the
[14] expert relying on it, plus I think we already had it, so for
[15] both reasons.
[16] **MR. STACK:** Note my objection.
[17] **THE COURT:** I do. But for both reasons I will allow
[18] it in.
[19] **Q.** And, Mr. Terry, what information did you take from this
[20] article that was of significance to your work in this case?
[21] **A.** Well, this was a summary of studies conducted at several
[22] locations on Long Island where there had been MTBE discharges.
[23] So, EPA went out and investigated these sites to determine how
[24] MTBE behaves, and so it was an important study for me to review
[25] because I wanted to understand the behavior of MTBE in the

Page 1998

[1] aquifer beneath Queens, the same aquifer being described here.
[2] **MR. SHER:** Liz, could you jump forward to the
[3] conclusions which are on the Bates number ending 1800.
[4] Can we show this to the jury now, your Honor?
[5] **THE COURT:** Yes.
[6] **Q.** Let's go back to the first page so the jury can see that.
[7] And highlight the title.
[8] The title is Characteristics of Gasoline Releases in
[9] the Water Table Aquifer of Long Island. Now let's go forward
[10] to the conclusions.
[11] Mr. Terry, could you read the portions of that that
[12] you think are significant for the jury to understand.
[13] **A.** This is saying, "Generally MTBE plumes are thousands of
[14] feet long"-- on Long Island anyway. "Because of vertical
[15] characterization of the sites, the plumes they studied in this
[16] study were documented to dive into the aquifer as it moves away
[17] from its source." Then it goes on to say conventional
[18] approaches to site characterization that rely on monitor wells
[19] with long screens generally do not delineate the extent of
[20] diving plumes such as these.
[21] **Q.** And what is the significance to you in your opinions of
[22] these conclusions?
[23] **A.** Well, I think the first generality was that generally MTBE
[24] plumes are thousands of feet long. So, we can expect that if
[25] there is an MTBE release at a site, given enough time it will

Page 1999

[1] form a long plume that extends for thousands of feet down
[2] grading of a release site.
[3] The other conclusion that I reached from this is that
[4] the characterization of the sites has shown that the plumes
[5] dive in the aquifer, so rather than stay near the top of the
[6] water table they tend to get deeper as they move away from the
[7] site, and we call that diving plume behavior.
[8] Then the third thing is that the ways that we
[9] conventionally had gone out to look at gasoline contamination
[10] at various gasoline station sites hasn't always been able to
[11] see that MTBE plume because it dives. Many times it dives
[12] deeper than can be seen by the types of wells that were
[13] typically installed at gasoline stations.
[14] **Q.** Let's go to the next page, please. And in the middle of
[15] the first full paragraph -- there you go.
[16] This statement says, "MTBE was only found after the
[17] municipal water supply wells were impacted. Similarly, at East
[18] Patchogue the contamination was detected only after the private
[19] well was impacted. In both cases the absence of MTBE in
[20] on-site soil and groundwater samples was insufficient for
[21] predicting potential future impacts to off-site receptors."
[22] Was this a statement that you considered significant
[23] in your analyses in this case?
[24] **A.** Yes, I considered this to be a very important aspect of the
[25] study.